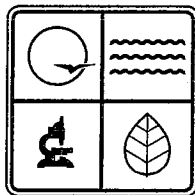


STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI AIR CONSERVATION COMMISSION

PERMIT BOOK



PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: **03 2 006 - 004** Project Number: 2005-12-045

Owner: Toyota Motor Manufacturing North American, Inc.

Owner's Address: 25 Atlantic Avenue, Erlanger, KY 41018

Installation Name: Bodine Aluminum, Inc.

Installation Address: 100 Cherry Blossom Way, Troy, MO 63379

Location Information: Lincoln County, S36, T36, R7W

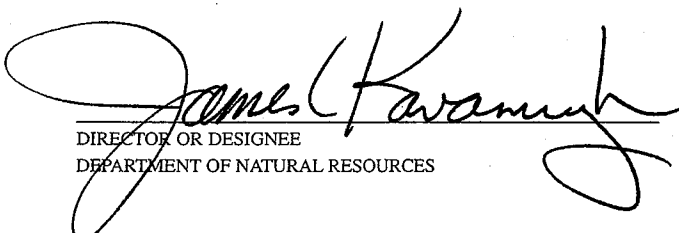
Application for Authority to Construct was made for:

Bodine Aluminum, Inc. is modifying its product mix and introducing new technology to their production by revising the production facility. They will install 81 low-pressure single cavity machines and 36 core machines and eliminate various existing equipment and processes between the years 2006 and 2013. This review was conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

-
- ☐ Standard Conditions (on reverse) are applicable to this permit.
- ☒ Standard Conditions (on reverse) and Special Conditions (listed as attachments starting on page 2) are applicable to this permit.

MAR - 2 2006

EFFECTIVE DATE


DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. Also, you must notify the Department of Natural Resources Regional Office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed Special Conditions as provided in RSMo 643.075. If you choose to appeal, the Air Pollution Control Program must receive your written declaration within 30 days of receipt of this permit.

If you choose not to appeal, this certificate, the project review, your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Department of Natural Resources has established the Outreach and Assistance Center to help in completing future applications or fielding complaints about the permitting process. You are invited to contact them at 1-800-361-4827 or (573) 526-6627, or in writing addressed to Outreach and Assistance Center, P.O. Box 176, Jefferson City, MO 65102-0176.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention Construction Permit Unit.

| | |
|-------------|-------------|
| Page No. | 2 |
| Permit No. | |
| Project No. | 2005-12-045 |

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W

1. Emission Limitations

- A. Bodine Aluminum, Inc. shall emit less than 250 tons of Volatile Organic Compounds (VOCs) from the entire installation in any consecutive 12-month period. This limitation includes all existing emission sources on site, and all new emission sources that are exempted from New Source Review permits. Note: If a new emission source is required to obtain a New Source Review permit, the conditions of this permit will be reevaluated as part of the permit review.
- B. Bodine Aluminum, Inc. shall emit less than 250 tons of Particulate Matter less than 10 microns in diameter (PM₁₀) from the entire installation in any consecutive 12-month period. This limitation includes all existing emission sources on site, and all new emission sources that are exempted from New Source Review permits. Note: If a new emission source is required to obtain a New Source Review permit, the conditions of this permit will be reevaluated as part of the permit review.
- C. Bodine Aluminum, Inc. shall emit less than 250 tons of Nitrogen Oxide (NO_x) from the entire installation in any consecutive 12-month period. This limitation includes all existing emission sources on site, and all new emission sources that are exempted from New Source Review permits. Note: If a new emission source is required to obtain a New Source Review permit, the conditions of this permit will be reevaluated as part of the permit review.

| | |
|-------------|-------------|
| Page No. | 3 |
| Permit No. | |
| Project No. | 2005-12-045 |

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 1: Emission Points Applicable to Special Condition 1.

| Emission Point | Stack ID's | Emission Point | Stack ID's |
|----------------|---|----------------------------|--------------------------|
| C1 | N/A | P1 | ST-6B |
| O2 | ST-25, ST-20, ST-19 | P2 | ST-6B |
| O3 | ST-19, ST-20 | P3 | ST-6B |
| O5 | ST-25, ST-20 | P4 | ST-6B |
| O6 | ST-24 | P5 Sand Reclaim Furnace #1 | ST-7 |
| OA1 | ST-24 | P5 Sand Reclaim Furnace #2 | ST-23 |
| OA2 | ST-3 | P6 | ST-6B |
| P16 | ST-6A | P7 | ST-6B |
| OA7 | HF-5, HF-8 to HF-11 | P8 | ST-6A |
| OA10 | ST-5 | P9 | ST-6A |
| M1 | See G-1 | P10 | ST-6A |
| G1 | EF-1 to EF-11, EF-14, EF-29 to 34, EF36, EF-37, EF-40, EF-42, EF44A, EF-45, EF-47, EF-49, EF-50, EF-52, EF-48 | P11 | ST-8 |
| C1 | G-1 | P12 | ST-6A |
| GA4 | HF1, HF-2 | P13 | ST-6A |
| P15S | ST-6A | P14 | ST-6A |
| P30 | ST-101, ST-102, ST-103, ST-104, ST-105, ST-106, ST-107, ST-108 | P15M | ST-4, ST-9, ST-11, ST-12 |

- D. Attachment A of Permit Number 1299-009A or equivalent forms approved by the Air Pollution Control Program that are adequate to determine the total emissions of PM₁₀, NO_x and VOC shall be used to demonstrate compliance with Special Conditions 1(A), 1(B), and 1(C). Bodine Aluminum, Inc. shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.
- E. Bodine Aluminum, Inc. shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after the end of the month during which the records from Special Condition Number 1(D) indicate that the source exceeds the limitation of Special Conditions Number 1(A), 1(B), and 1(C).

| | |
|-------------|-------------|
| Page No. | 4 |
| Permit No. | |
| Project No. | 2005-12-045 |

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

2. Pollution Control Equipment

- A. The control equipment associated with the equipment in this permit must be in operation all times when the equipment is in operation. The control equipment shall be operated and maintained in accordance with the manufacturer's specifications.
- B. Bodine Aluminum, Inc. shall maintain an operating and maintenance log for the control equipment which shall include the following:
 - i. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions;
 - ii. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - iii. A written record of regular inspection schedule, the date and results of all inspections including any actions or maintenance activities that result from that inspection.
 - iv. Bodine shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.

Table 2: Pollution Control Equipment Applicable to Special Condition 2.

| Device Number and Code | Type | Device Number and Code | Type |
|------------------------|---------------------------|------------------------|----------|
| OD-6, 001 | ABB Wet Scrubber | DC-2, 017 | Baghouse |
| OD-5, 001 | ABB Wet Scrubber | DC-3, 016 | Baghouse |
| OD-4, 001 | ABB Wet Scrubber | DC-9, 017 | Baghouse |
| OD-3, 001 | ABB Wet Scrubber | DC-10,017 | Baghouse |
| OD-2, 001 | ABB Wet Scrubber | DC-12, 016 | Baghouse |
| OD-1, 021 | Baghouse/thermal Oxidizer | DC-14, 018 | Baghouse |
| DC-1B, 017 | Baghouse | DC-16, 017 | Baghouse |
| DC-1A, 017 | Baghouse | | |

3. Restriction of Odors

- A. If a continued situation of demonstrated nuisance odors exists in violation of 10 CSR 10-3.090, the Director may require through written notice Bodine Aluminum Inc. to submit a corrective action plan within ten (10) days adequate to timely and significantly mitigate the odors. Bodine Aluminum Inc. shall implement any such plan immediately upon its approval by the Director. Failure to either submit or implement such a plan shall be in violation of this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2005-12-045
Installation ID Number: 113-0029
Permit Number:

Bodine Aluminum, Inc.
100 Cherry Blossom Way
Troy, MO 63379

Complete: January 04, 2006
Reviewed: January 24, 2006

Parent Company:
Toyota Motor Mfg North America
25 Atlantic Avenue
Erlanger, KY 41018

Lincoln County, S36, T36, R7W

REVIEW SUMMARY

- Bodine Aluminum, Inc. has applied for authority to install 81 low pressure single cavity machines and 36 core machines and eliminate various existing equipment and processes between the years 2006 and 2013.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are acetaldehyde, benzene, cresol, formaldehyde, phenol, toluene, and xylene. With the exception of phenol, potential emissions of these HAPs are expected to be below threshold levels. The screen modeling action level (SMAL) is 0.1 tons per year for phenol. The Risk Assessment Levels (RALs) for the 24 hour and annual concentration are compared to calculated values in Table 3. Phenol emissions are in compliance with the 24 hour and annual concentration values.
- None of the New Source Performance Standards (NSPS) apply to the proposed equipment.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) or currently promulgated Maximum Achievable Control Technology (MACT) regulations apply to the proposed equipment. The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart RRR, *National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production*, does not apply since the installation is not a major source of HAPs. Furthermore, Bodine Aluminum is a die casting installation that only melts clean charge.
- The five (5) existing ABB KEM-PAK wet scrubbers will be used to control VOC and PM₁₀ emissions from the new and replaced core and casting machines. The VOCs are passing through a packed tower counter current to a scrubbing liquid containing hydrogen peroxide and ferrous ion.

- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of VOC, NO_x, and PM₁₀ are above de minimis levels but below major levels.
- This installation is located in Lincoln County, an attainment area for all criteria air pollutants.
- This installation is not on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2].
- Ambient air quality modeling was not performed for this review. No Screen3 model is currently available which can accurately predict ambient ozone concentrations caused by this installation's VOC, NO_x, and PM₁₀ emissions.
- Emissions testing is not required for the equipment.
- Bodine/Toyota will submit an application to modify its existing Part 70 Operating Permit within one year of new equipment startup. Recognizing that there will be numerous instances of new equipment startup under this permit, the submission of an application to modify the existing Part 70 operating permit is required only once, with the one-year clock starting with the installation of the first piece of new equipment. This permit covers construction that will be occurring from March 2006 to December 2013. However, Bodine Aluminum Inc. shall provide an attachment to the P70 Annual Compliance Certification containing a list of equipment upgrades, equipment relocation, removal, and new equipment installed for the equipment authorized under this permit.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Bodine Aluminum Inc. is an aluminum die casting installation located in Lincoln County. They are a wholly owned division of Toyota Motor Manufacturing of North America. They have operated an aluminum casting facility in Troy, Missouri since 1992. Bodine Aluminum Inc. produces engine components to support Toyota's North American vehicle manufacturing operations. In order to reach its present production capacity, they have had two plant expansions since the original construction in 1992. Processes at the installation include, but are not limited to, aluminum melting, aluminum casting, heat treating, core molding and sand reclamation. Bodine Aluminum was issued a Part 70 Operation Permit (Permit Number: 113-0029-001) on November 9, 1998. The installation submitted a Part 70 Operating Permit Renewal on July 23, 2003.

The following construction permits have been issued to Bodine Aluminum, Inc. from the Air Pollution Control Program.

Table 3:Permits issued to Bodine Aluminum, Inc. (113-0029)

| Permit | Project Description |
|------------|--|
| 0591-003 | Original permit for the existing plant |
| 0593-008 | Installation of natural gas oven to dry recycled aluminum prior to melting |
| 1193-006 | Addition of six (6) machining centers and a washing station to produce engine brackets |
| 0194-014 | Addition of a shot blaster to rework surface areas |
| 0995-005 | Increase production by 1,825 tons of poured aluminum |
| 0196-019 | Addition of new building and increase production |
| 0996-011 | Addition of a natural gas fired die heating oven, burner capacity 2 MMBtu/hr |
| OP | Part 70 Operating permit 11/9/1996 |
| 1299-009 | Addition of casting machines |
| 1299-009A | Amendment to Permit Number 1299-009. |
| OP | Part 70 Operating permit 01/03/2005 |
| 112004-005 | Replace Casting and Machine equipment |

Bodine Aluminum Inc. was issued Notice of Violation (NOV) SL1870 on February 15, 2001 for construction permit violations.

PROJECT DESCRIPTION

In order to remain competitive, the proposed project will involve the removal of several machines that will be replaced with new machines that represent updated technological advances. The associated equipment will be upgraded over the next seven (7) years. Bodine Aluminum Inc. will be revising its production facility, modifying the product mix, and introducing new technology to its production building and a corresponding upgrade to the HVAC system. The activities associated with this project include: 1) eliminate melting furnaces, 2) eliminate gravity casting and associated machining, 3) eliminate vacuum casting, 4) eliminate high pressure casting, 5) replace the 30 low pressure, two cavity machines with 81 low pressure, single cavity machines for cylinder heads, 6) increase the number of core machines from 45 to 81, 7) expand the size of the current building in three steps, 8) add a total of six (6) HVAC units over the three building expansions. 9) add a total of nine (9) general plant exhaust vents for the three bay expansions. All of the emissions from the current and future core and casting machines will continue to be vented through the existing odor scrubbers. No new emission points are being authorized with this permit. However, with the expansion of the building nine (9) additional general plant exhaust fans (EF63-EF71) will be installed along with six natural gas fired furnaces to heat the additional space. The installation of the exhaust fans will exhaust fugitive emissions from the new products. The emissions from the general exhaust are included in the emission calculations. The finished cylinder head and cylinder block castings must be heat treated to 600C to age the casting and to allow for complete removal of the sand binder. This generates minimal VOC emissions which are exhausted to the atmosphere through the plant ventilation system. The baghouses used to collect the PM emissions from die cleaning are vented inside of the building and are exhausted to the atmosphere through the plant ventilation system.

The new machines will replace existing equipment. However, process emissions (e.g. core machines, casting machines, etc.) will continue to vent through current permitted emission point sources (e.g., OD-2, OD-3, etc.). Bodine Aluminum has proposed and demonstrated by calculation that they can maintain 250 tons installation wide emission caps. In Permit Number 1299-009A, Bodine Aluminum was limited to 250 tons of PM₁₀, nitrogen oxide (NO_x), and volatile organic compounds (VOC) emissions, each, for the entire installation.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis were based on test data already approved by the Air Pollution Control Program. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year). The following table provides an emissions summary for this project.

Table 4: Emissions Summary (tons per year).

| Pollutant | Regulatory <i>De Minimis</i> Levels | Existing Potential Emissions | Existing Actual Emissions (2004 EIQ) | Potential Emissions of the Application** | New Installation Conditioned Potential |
|------------------|---|------------------------------------|---|---|---|
| PM ₁₀ | 15.0 | < 250.0 | 63.77 | 60.20 | < 250.0 |
| SO _x | 40.0 | N/D | 6.76 | 0.05 | N/A |
| NO _x | 40.0 | < 250.0 | 76.48 | 68.89 | < 250.0 |
| VOC | 40.0 | < 250.0 | 116.12 | 127.56 | < 250.0 |
| CO | 100.0 | N/D | 2.87 | 2.35 | N/A |
| HAPs | 10.0/25.0 | N/D | 5.35 | 4.57 | N/A |
| Acetaldehyde | 10 | N/D | N/D | 0.335 | N/A |
| Benezene | 10 | N/D | N/D | 0.270 | N/A |
| Cresol | 10 | N/D | N/D | 0.425 | N/A |
| Formaldehyde | 10 | N/D | N/D | 0.923 | N/A |
| Phenol | 10 | N/D | N/D | 2.518 | N/A |
| Toluene | 10 | N/D | N/D | 0.102 | N/A |
| Xylene | 10 | N/D | N/D | 0.002 | N/A |

N/A = Not Applicable; N/D = Not Determined.

**The potential emission increases associated with the new equipment.

Per the instructions established for the Emission Inventory Questionnaire (EIQ), those HAPs that are either VOCs or Particulate Matter less than 10 microns (PM₁₀) can be reported as VOC on the EIQ. All of the HAPs in this review can be counted as a VOC on the EIQ. For potential to emit calculations in this permit, the HAPs are counted both as HAPS and as VOC emission.

The emission factors and control efficiencies used in the construction permit application are consistent with those found in the facility's most recent Title V and construction permits. A stack test conducted in February 2000 verifies that the emission factors used in the application are conservative. In a letter dated October 03, 2000 Steve

Feeler of the Enforcement Section of the Air Program concurred with these findings. However, emission factors for casting operations were originally calculated based on the amount of aluminum processed. Emissions occur from core sand usage in the process and from the associated resin thermal destruction. However, many of the current casting machines produce two (2) parts per shot (e.g. 2 cylinder heads each time the machine cycles). The current core sand used in casting engine components will not change as a result of the equipment upgrade. The design of the new machines only allows for the production of one part per shot. The sand to metal usage ratio used in the casting operations is essentially constant at 0.791 ton of sand per ton of aluminum metal. The emission factors for casting operations that were previously adjusted to represent metal usage have been adjusted to represent a sand usage basis. The same calculations apply for converting the HAP emission factors.

$(3.25 \text{ pounds of PM}_{10} / 1 \text{ ton metal}) \text{ multiplied by } (1 \text{ ton metal} / 0.791 \text{ ton of sand}) = 4.11 \text{ pounds of PM}_{10} / \text{ton sand}$

$(4.94 \text{ pounds of VOC} / 1 \text{ ton metal}) \text{ multiplied } (1 \text{ ton metal} / 0.791 \text{ ton of sand}) = 6.25 \text{ pounds of VOC} / \text{ton sand}$

In project number 2001-06-013 which was an amendment to permit 1299-099, Bodine Aluminum Incorporated proposed to use a new record keeping sheet to track emissions of criteria air pollutants from the entire installation. This record keeping sheet simplified the review of plant operations during a plant compliance audit. They will continue to use the existing format with some modification. As the plant emissions will now be based on tons of sand rather than tons of metal, this form will need to be updated. It is important to note that the original emission tests were conducted on the sand basis and converted to metal bases. As new products are added and existing products are removed the production data will change. However, review of the record keeping forms and the calculations submitted with the application give support that the emissions limits are closely monitored and compliance audits are simplified.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section 6 of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀, NO_x and VOC are above de minimis levels, but below major levels.

APPLICABLE REQUIREMENTS

Bodine Aluminum, Inc. shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required April 1 for the previous year's emissions.
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-3.090

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-3.060

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of the HAP phenol. The screen modeling action level (SMAL) is 0.1 tons per year for phenol. The Risk Assessment Levels (RALs) for the 24-hour and annual concentration are compared to calculated values in Table 3 below. No Screen 3 model is currently available, which can accurately predict ambient ozone concentrations caused by this installation's VOC emissions.

Table 5: Ambient Air Quality Analysis.

| Pollutant | Modeled Impact ($\mu\text{g}/\text{m}^3$) | 24 hour Concentration ($\mu\text{g}/\text{m}^3$) | 24 hour RAL Concentration ($\mu\text{g}/\text{m}^3$) | Annual Concentration ($\mu\text{g}/\text{m}^3$) | Annual RAL Concentration ($\mu\text{g}/\text{m}^3$) |
|-----------|--|---|---|--|--|
| Phenol | 5.97 | 2.39 | 45 | 0.47 | 9.5 |

Table 3 shows that Bodine Aluminum, Inc. is in compliance with the risk assessment levels for the HAPs listed in the time frames and concentrations established.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

Timothy Paul Hines
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated 12/22/05, received 12/28/05, designating Toyota Motor Manufacturing North American, Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Saint Louis Regional Office Site Survey, dated 01/04/06.